

LISTING OF CLAIMS

1
2 1. (Previously Presented) A blending method comprising:
3 providing a set of examples that pertain to a shape or motion that is to be
4 animated, the examples being provided relative to a multi-dimensional abstract
5 space defined by at least one of an adjective and an adverb;
6 selecting a point within the multi-dimensional abstract space that does not
7 coincide with a point that is associated with any of the examples, the selected
8 point corresponding to a shape or motion within the abstract space;
9 computing a single weight value for each of the examples; and
10 combining the single weight values for each of the examples in a manner
11 that defines an interpolated shape or motion that is a blended combination of each
12 of the examples of the set of examples.

13
14 2. (Original) The blending method of claim 1, wherein said
15 selecting is performed by an application.

16
17 3. (Original) The blending method of claim 1, wherein said
18 selecting is performed by a game application.

19
20 4. (Original) The blending method of claim 1, wherein said
21 selecting is performed at run time.

22
23 5. (Original) The blending method of claim 1, wherein said
24 computing is performed at run time.
25

1 6. (Original) The blending method of claim 1, wherein said
2 computing and combining are performed at run time.

3
4 7. (Original) The blending method of claim 1, wherein said
5 computing comprises:

6 defining a cardinal basis for each example; and
7 evaluating the cardinal basis for each example relative to the selected point
8 to provide the weight value.

9
10 8. (Original) The blending method of claim 7, wherein the cardinal
11 basis comprises:

12 a radial basis function portion; and
13 another portion that is different from the radial basis function portion.

14
15 9. (Original) The blending method of claim 8, wherein said another
16 portion is not a radial basis function portion.

17
18 10. (Original) The blending method of claim 8, wherein said another
19 portion is a linear portion.

20
21 11. (Original) One or more computer-readable media having
22 computer-readable instructions thereon which, when executed by a computer,
23 implement the method of claim 1.

1 12. (Original) A computerized blending system that is programmed
2 with instructions which, when executed by the system, implement the method of
3 claim 1.
4

5 13. (Previously Presented) A blending method comprising:
6 linearly approximating a degree of freedom that is associated with a new
7 form or motion that is to be rendered based upon a plurality of examples that
8 define respective forms or motions within an abstract space;
9 defining a radial basis function for each of the examples;
10 combining the linear approximation and the radial basis functions to
11 provide a cardinal basis function; and
12 using the cardinal basis function to render the new form or motion.
13

14 14. (Original) The blending method of claim 13, wherein:
15 said acts of linearly approximating and said defining are performed for each
16 example; and
17 said combining comprises combining each of the respective linear
18 approximations and their associated radial basis functions to provide multiple
19 cardinal basis functions, one for each example; and
20 said using comprises combining the multiple cardinal basis functions to
21 define a function that describes the new form or shape within the abstract space.
22

23 15. (Original) The blending method of claim 13, wherein said
24 defining comprises scaling the radial basis function for each example.
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1 16. (Original) The blending method of claim 15, wherein said scaling
2 comprises evaluating a matrix system to ascertain a plurality of scaling weights,
3 individual weights of which are used to scale the radial basis functions.

4
5 17. (Original) The blending method of claim 16, wherein said matrix
6 system is configured so that its evaluation yields scaling weights which, when
7 used to scale a corresponding radial basis functions, result in a combination of the
8 radial basis functions and the linear approximation to provide the cardinal basis
9 function.

10
11 18. (Original) The blending method of claim 13, wherein the radial
12 basis functions are selected from a b-spline family of radial basis functions.

13
14 19. (Original) The blending method of claim 13, wherein said
15 linearly approximating comprises approximating the degree of freedom with a
16 least squares linear approximation.

17
18 20. (Original) One or more computer-readable media having
19 computer-readable instructions thereon which, when executed by a computer,
20 implement the method of claim 13.

21
22 21. (Original) A computerized blending system that is programmed
23 with instructions which, when executed by the system, implement the method of
24 claim 13.

25

1 22. (Original) One or more computer-readable media having
2 computer-readable instructions thereon which, when executed by a computer,
3 cause the computer to:

4 linearly approximate a degree of freedom that is associated with a new form
5 or motion that is to be rendered based upon a plurality of examples that define
6 respective forms or motions within an abstract space, by deriving basis
7 hyperplanes that fit a least squares hyperplane to a case where one example has a
8 value of 1 and the remaining examples have values of 0;

9 account for residuals between the example values and the hyperplane by:

10 associating a radial basis function with each example;

11 ascertaining a radial basis weight value for each radial basis
12 function; and

13 scaling each radial basis function by its ascertained radial basis
14 weight value; and

15 sum the linear approximation and scaled radial basis functions to provide a
16 cardinal basis function.

17
18 23. (Original) The computer-readable media of claim 22, wherein the
19 instructions cause the computer to perform the recited acts of linear
20 approximation, accounting, and summing for each example to provide multiple
21 cardinal basis functions.

22
23 24. (Original) The computer-readable media of claim 23, wherein the
24 instructions further cause the computer to sum the multiple cardinal basis
25

1 functions to provide a function that describes the new form or motion within the
2 abstract space.

3
4 25. (Original) The computer-readable media of claim 24, wherein the
5 instructions cause the computer to select a point on the defined function and
6 render a new form or motion.

7
8 26. (Original) The computer-readable media of claim 22, wherein
9 each radial basis function has a width that is a function of the distance between its
10 associated example and the next nearest example in abstract space.

11
12 27. (Original) The computer-readable media of claim 22, wherein
13 each radial basis function is selected from the b-spline family of radial basis
14 functions.

15
16 28. (Original) A computerized blending system comprising:
17 at least one computer-readable media;
18 at least one processor;
19 instructions resident on the computer-readable media which, when executed
20 by the processor, cause the blending system to:

21 linearly approximate a degree of freedom that is associated with a
22 new form or motion that is to be rendered based upon a plurality of examples that
23 define respective forms or motions within an abstract space, by deriving basis
24 hyperplanes that fit a least squares hyperplane to a case where one example has a
25 value of 1 and the remaining examples have values of 0;

1 account for residuals between the example values and the hyperplane by:
2 associating a radial basis function with each example;
3 ascertaining a radial basis weight value for each radial basis
4 function; and
5 scaling each radial basis function by its ascertained radial basis
6 weight value; and
7 sum the linear approximation and scaled radial basis functions to provide a
8 cardinal basis function.

9
10 29. (Original) The computerized blending system of claim 28,
11 wherein the instructions cause the blending system to perform the recited acts of
12 linear approximation, accounting, and summing for each example to provide
13 multiple cardinal basis functions.

14
15 30. (Original) The computerized blending system of claim 29,
16 wherein the instructions further cause the blending system to sum the cardinal
17 basis functions to provide a function that describes the new form or motion within
18 the abstract space.

19
20 31. (Original) The computerized blending system of claim 30,
21 wherein the instructions cause the blending system to select a point on the defined
22 function and render a new form or motion.

1 32. (Original) The computerized blending system of claim 28,
2 wherein each radial basis function has a width that is a function of the distance
3 between its associated example and the next nearest example in abstract space.
4

5 33. (Original) The computerized blending system of claim 28,
6 wherein each radial basis function is selected from the b-spline family of radial
7 basis functions.
8

9 34. (Previously Presented) A blending method comprising:
10 defining a set of examples that pertain to a form or motion that is to be
11 animated, the examples being provided relative to a multi-dimensional abstract
12 space defined by at least one of an adjective and an adverb;

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13 examining a plurality of forms or motions that are animated within the
14 abstract space from the defined set of examples;

15 identifying at least one form or motion that is undesirable;

16 selecting a form or motion from a location within the abstract space that is
17 proximate a location that corresponds to the undesirable form or motion; and

18 replacing the undesirable form or motion with the selected form or motion
19 to provide a pseudo-example that constitutes a linear sum of the examples of the
20 set of examples.
21

22 35. (Original) The blending method of claim 34 further comprising,
23 prior to said examining, providing the plurality of forms or motions by, for each
24 form or motion:
25

1 linearly approximating a degree of freedom that is associated with a new
2 form or motion that is to be rendered based upon the set of examples;
3 defining a radial basis function for each of the examples;
4 combining the linear approximation and the radial basis functions to
5 provide a cardinal basis function; and
6 using the cardinal basis function to render the new form or motion.
7

8 36. (Original) The blending method of claim 35, wherein:
9 said acts of linearly approximating and said defining are performed for each
10 example; and
11 said combining comprises combining each of the respective linear
12 approximations and their associated radial basis functions to provide multiple
13 cardinal basis functions, one for each example; and
14 said using comprises combining the multiple cardinal basis functions to
15 define a function that describes the new form or shape within the abstract space.
16

17 37. (Original) The blending method of claim 36, wherein the radial
18 basis functions are selected from a b-spline family of radial basis functions.
19

20 38. (Original) The blending method of claim 37 further comprising,
21 after said replacing producing a plurality of new forms or motions by repeating
22 said acts of linearly approximating a degree of freedom, defining a radial basis
23 function, combining and using, the pseudo-examples influencing the shape of the
24 cardinal basis functions.
25

1 39. (Previously Presented) A blending method comprising:
2 defining at least two examples of a form in a multi-dimensional abstract
3 space, the multi-dimensional abstract space being defined by at least one of an
4 adjective and an adverb, a first of the example forms being defined in a first
5 position in the multi-dimensional abstract space and a second of the example
6 forms being defined in a second position in the multi-dimensional abstract space
7 that is different from the first position; and
8 computing a form in the first position such that when the computed form is
9 subjected to a transform blending operation that places the computed form in the
10 second position, it will match the second example form.

11
12 40. (Original) The blending method of claim 39, wherein the first
13 position is a rest position.

14
15 41. (Original) The blending method of claim 39, wherein the first
16 position is a rest position and the second position is angularly displaced from the
17 first position.

18
19 42. (Original) The blending method of claim 39, wherein said
20 computing comprises computing a plurality of vertices associated with the form.

21
22 43. (Original) The blending method of claim 42 further comprising,
23 after computing the plurality of vertices, geometrically blending the computed
24 form in the first position with the first example form in the first position to provide
25 a geometrically blended form in the first position.

1
2 44. (Original) The blending method of claim 43 further comprising
3 after said geometrically blending, transform blending the geometrically blended
4 form to provide the form that matches the second example form.

5
6 45. (Original) The blending method of claim 39, wherein the
7 example forms pertain to a skeleton-based figure.

8
9 46. (Previously Presented) One of more computer-readable media
10 having computer-readable instructions thereon which, when executed by a
11 computer, cause the computer to:

12 define at least two examples of a form in a multi-dimensional abstract
13 space, the multi-dimensional abstract space being defined by at least one of an
14 adjective and an adverb, a first of the example forms being defined in a first
15 position in the multi-dimensional abstract space and a second of the example
16 forms being defined in a second position in the multi-dimensional abstract space
17 that is different from the first position; and

18 compute a form in the first position such that when the computed form is
19 subjected to a transform blending operation that places the computed form in the
20 second position, it will match the second example form.